Davis Blalock

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EDUCATION

***Massachusetts Institute of Technology,* 2014 -**
- Computer Science M.S. 2014-2016, Ph.D. 2016-present

***University of Virginia,* 2010 - 2014**
- Majors: Electrical Engineering and Cognitive Science (computer science concentration)
- Cumulative GPA: 3.99 / 4.00

HONORS & AWARDS

National
- 2018 Qualcomm Innovation Fellowship
- 2014 National Science Foundation Graduate Research Fellow
- 2013 Barry M. Goldwater Scholar

University
- 2014 MIT Harold E. Edgerton Fellowship *(~10 incoming EECS PhD students)*
- 2014 UVA SEAS Edgar F. Shannon award *(1 recipient, academics and service)*
- 2014 UVA SEAS "Outstanding Student" award *(4 recipients, academics and leadership)*
- 2013 UVA ECE Dept. Chairperson's award *(3 recipients, academics and leadership)*
- 2013 UVA ECE Dept. James S. Miller award *(3 recipients, academics)*
- 2013 One of three UVA undergraduates selected to teach a "student-taught class"
- 2010 UVA Rodman Scholar *(top ~5% of incoming engineering class)*

ACADEMIC RESEARCH EXPERIENCE

John Guttag Research Group, *Graduate Research Assistant* Aug 2014 - Present
- Designing machine learning algorithms that require less time, space, and labeled data
- Learning from sequences and time series with few and weak labels (ICDM 2016, NeurIPS 2018)
- Accelerating fundamental machine learning operations while also saving space (KDD 2017)
- Rapidly compressing data to save space in both databases and low-power devices (UBICOMP 2018)
- Currently working on accelerating convolutional neural networks, as well as building a federated learning system with a strong threat model

Levy Lab, *Undergraduate Researcher* May 2013 - Jan 2014
- Investigated information-theoretic properties of biological neural networks (PLoS Comp Bio 2015)
- Created open-source tools for simulation of adaptive synaptogenesis networks in MATLAB

INERTIA Research Group, *Undergraduate Researcher* Sept 2012 - June 2014

- Designed and implemented high-speed algorithm for online classification on low-power hardware
- Android and embedded C development for wearable platform

INDUSTRY RESEARCH EXPERIENCE

Google Research & Machine Intelligence Team, *PhD Intern* May 2016 - Aug 2016

- Extended TensorFlow Wide & Deep models to sequence data
- Ran experiments on hundreds of millions of examples using distributed training infrastructure
- Code now used in production within a popular Google product

PocketSonics, Inc, *Intern* July 2010 - Jan 2013

- Worked with UVA professors commercializing breakthrough handheld ultrasound imaging technology
- Helped create multicore C/C++ pipeline for real-time data processing using pthread
- Led development of Android-based user interface, including Android framework alterations
- Performed extensive software testing and documentation for FDA certification

PUBLICATIONS

Shanmugam, Divya, **Davis W. Blalock**, Jen Gong, and John V. Guttag. "Multiple Instance Learning for ECG Risk Stratification." NeurIPS Machine Learning for Healthcare workshop. Spotlight presentation (top 6% of submissions).

Davis W. Blalock and John V. Guttag. "Sprintz: Time Series Compression for the Internet of Things." Interactive, Mobile, Wearable, and Ubiquitous Technologies (IMWUT/UBICOMP), 2018.

Davis W. Blalock and John V. Guttag. "Bolt: Accelerated Data Mining with Fast Vector Compression." Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2017.

Davis W. Blalock, and John V. Guttag. "EXTRACT: Strong Examples from Weakly-Labeled Sensor Data." Proceedings of the 16th IEEE International Conference on Data Mining, 2016.

Davis W. Blalock, and John V. Guttag. "Feature Flocks: Accurate Pattern Discovery in Multivariate Time Series." M.S. Thesis at the Massachusetts Institute of Technology, 2016.

Blake T. Thomas, **Davis W. Blalock**, and William B Levy. "Adaptive Synaptogenesis Constructs Neural Codes that Benefit Discrimination." PLoS Computational Biology, 2015.

TEACHING

6.000 - "Introduction to Computer Science and Programming in Python", *TA* Aug 2016 - Dec 2016
- Designed assignments, graded exams, and held office hours for class of 400+ students.

ENGR 1501 - "Brain Hacks", *Instructor* Aug 2013 - Dec 2013
- Developed and taught a class on highlights of psychology and neuroscience useful for everyday life
- Also covered basic game theory, ethology, behavioral economics, and decision theory
- Designed and implemented curriculum, graded all assignments, and lectured every week

Eta Kappa Nu Honor Society, *Tutor* Aug 2013 - May 2014
- Tutored undergraduates on electrical and computer engineering material

OTHER PROJECTS

Among other things, I have created two macOS apps, a real-time gesture recognizer on a 20MHz microcontroller, an iOS app for streaming mobile/wearable sensor data, a Paxos-based key-value store in Go, a Marionette.js app for fitness tracking, a C++ array library, various cognitive science essays, and a novel. I also helped run the Cybersecurity Factory startup incubator for a few months.

SKILLS

Software
- Python *(TensorFlow, Keras, NumPy, SciPy, Pandas, Scikit-Learn)*, C, C++, Objective-C *(iOS, Mac)*, Java *(Android)*, x86 assembly (esp. AVX/AVX2), Go, Bash, MATLAB, basic HTML/CSS/JS
- Experienced with software engineering practices
- Experienced with performance engineering at both the algorithm and implementation level

Machine Learning and Data Mining
- Strong knowledge of machine learning both in theory and practice
- Particular experience with time series and design of high-performance learning algorithms

Working with a Team
- Enjoy mentoring younger students
- Project manager on engineering projects throughout graduate school, college, and high school
- Organized 30+ club and other events in graduate school, and many more as an undergraduate
- Excellent communicator and writer